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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/730,100	12/05/2000	Paul S. Nolan	6121	7486

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EXAMINER

KUHAR, ANTHONY J

ART UNIT

PAPER NUMBER

1754

DATE MAILED: 03/31/2003

9

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/730,100

Applicant(s)

NOLAN ET AL.

Examiner

Anthony J Kuhar

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 16-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 16-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 11-17, the metes and bounds of “substantially” are indefinite. See MPEP 2173.05(b).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Allgulin ‘274.

Allgulin ‘274 teaches in column 2, lines 47-64 oxidizing mercury in a flue gas with oxidizing agents such as chlorine. Column 3, lines 7-8 teach subsequent precipitating reagents such as sulfide ions. Example 1 shows that the selected temperature of the flue gas allows the use of aqueous species and low temperature gases in oxidizing the mercury.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allgulin '274.

Allgulin '274 teaches in column 2, lines 47-64 oxidizing mercury in a flue gas with oxidizing agents such as chlorine. Column 3, lines 7-8 teach subsequent precipitating reagents such as sulfide ions. Example 1 shows that the selected temperature of the flue gas allows the use of aqueous species and low temperature gases in oxidizing the mercury. It also appears that substantially all of the elemental mercury vapor is converted to oxidized mercury from Example 1.

Claims 1, 4, and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO '228 in view of Allgulin '274.

WO '228 teaches a process for oxidizing gaseous pollutants in a flue gas stream containing mercury vapor whereby chlorine in gaseous form, liquid form, or as a water solution is injected into the mercury containing gas at temperatures of greater than 100 C to oxidize the chlorine (see page 2, lines 17-27). The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to select the portion of the prior art's range of temperatures for oxidizing the mercury which is within the range of applicant's claims because it has been held to be obvious to select a value in a known range by optimization for the best results, see *In re Boesch*, 205 USPQ 215. WO '228 does not subsequently use sulfide to precipitate the oxidized mercury.

Allgulin '274 also teaches in column 2, lines 47-64 oxidizing mercury in a flue gas with oxidizing agents such as chlorine. Column 3, lines 7-8 teach subsequent precipitating reagents such as sulfide ions. Example 1 shows that the selected temperature of the flue gas allows the use of aqueous species and low temperature gases in oxidizing the mercury. It also appears that

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substantially all of the elemental mercury vapor is converted to oxidized mercury from Example 1. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to oxidize the mercury using the methods of WO '228 and further precipitate the oxidized mercury using sulfide because it would have been obvious to use the product of one process as a reactant in another process if they are similar materials and the "other process" requires the product. See *In re Kamlet* 88 USPQ 106 CCPA 1950 and Allgulin appears to use the same method of oxidizing the mercury as the WO reference.

Claims 1-14 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenthal '304 in view of Higuchi '871.

Rosenthal '304 teaches in column 1, line 66 to column 2, line 47 cooling an incinerator flue gas to below 300 C, preferably below 200 C, oxidizing the mercury in the incinerator flue gas, and adding an alkali sulfide solution to precipitate mercury in the flue gas. The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to select the portion of the prior art's range which is within the range of applicant's claims because it has been held to be obvious to select a value in a known range by optimization for the best results, see *In re Boesch*, 205 USPQ 215. Thus the selected temperature is sufficient to allow use of aqueous species and low temperature gases in converting elemental mercury to oxidized mercury. It is also possible to add an oxidizing agent prior to introduction of the sulfide (see column 2, lines 44-47). The example shows substantially all of the mercury is removed. Rosenthal does not disclose chlorine or oxi-acid species containing

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chlorine as the oxidizing agents nor does he additionally disclose the use of an alkali wash solution in the removal of the oxidized mercury.

However, Higuchi '871 teaches in column 6, lines 30-35 that hypochlorite, hypochlorous acid, and their salts can be used to oxidize mercury in gases. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the process of Rosenthal by oxidizing the mercury using the oxidizing agents of Higuchi because Rosenthal calls for the use of oxidizing agents, and Higuchi provides oxi-acid species containing chlorine as those oxidizing agents. Higuchi also additionally uses alkali solution in column 3, lines 20-30 to remove mercuric chlorides. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to additionally use the alkali solution of Higuchi in the process of Rosenthal since Higuchi provides another method by which oxidized mercury can be removed from gases in addition to precipitation using sulfides. The combined effect of processes separately known to work would be obvious; processes that are known to work separately would be obvious to combine for their added combined effect, *Ex parte Novak* 16 USPQ 2d 2041.

Claims 1, 4, and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenthal '304 in view of WO '228.

Rosenthal '304 teaches in column 1, line 66 to column 2, line 47 cooling an incinerator flue gas to below 300 C, preferably below 200 C, oxidizing the mercury in the incinerator flue gas, and adding an alkali sulfide solution to precipitate mercury in the flue gas. The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to select the portion of the prior art's range which is within the range of

applicant's claims because it has been held to be obvious to select a value in a known range by optimization for the best results, see *In re Boesch*, 205 USPQ 215. Thus the selected temperature is sufficient to allow use of aqueous species and low temperature gases in converting elemental mercury to oxidized mercury. It is also possible to add an oxidizing agent prior to introduction of the sulfide (see column 2, lines 44-47). The example shows substantially all of the mercury is removed. Rosenthal does not disclose aqueous chlorine as the oxidizing agent.

WO '228 teaches a process for oxidizing gaseous pollutants in a flue gas stream containing mercury vapor whereby chlorine in gaseous form, liquid form, or as a water solution is injected into the mercury containing gas at temperatures of greater than 100 C to oxidize the chlorine (see page 2, lines 17-27). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify the process of Rosenthal by oxidizing the mercury using the aqueous chlorine of WO '228 because Rosenthal calls for the use of oxidizing agents, and WO '228 provides aqueous chlorine as an oxidizing agent.

Claims 1-14 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Higuchi '871 in view of EP 0709128 A3.

Higuchi '871 teaches in column 6, lines 30-35 that hypochlorite, hypochlorous acid, and their salts can be used to oxidize mercury in gases. It also appears that substantially all of the elemental mercury is converted to oxidized mercury in tests that utilize hypochlorite in Tables 1 and 2. Higuchi also additionally uses alkali solution in column 3, lines 20-30 to remove mercuric chlorides. Higuchi '871 teaches in column 3, line 51 that the flue gas from the incinerator is cooled to 300 C prior to being washed with a harmful glass cleaner- which

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comprises the oxidizing agents according to column 6. As the gas is being washed, it appears that the temperature would continue to decrease. It would have been obvious to one of ordinary skill in the art at the time the invention was made to determine the optimum temperatures, if not already inherently possessed in the process of Higuchi, in view of lack of unexpected results because it is not inventive to determine the optimum or workable range which only requires routine experimentation, see *In re Boesch*, 205 USPQ 215. It also appears the temperature that was used in the Higuchi reference was sufficient to allow use of aqueous species and low temperature gases in converting elemental mercury to oxidized mercury. Higuchi '871 does not teach removing oxidized mercury subsequent to and separate from the chlorine treatment step.

Page 6 of the English translation of EP 0709128 A3 shows adding sodium tetrasulfide to mercury containing exhaust gas. The tetrasulfide breaks down to sulfide, which reacts with both oxidized mercury and elemental mercury in the exhaust gas to precipitate onto a filter. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to provide the oxidized mercury using the process of the Higuchi reference and remove the oxidized mercury using the sulfide of the EP reference because it would have been obvious to use the product of one process as a reactant in another process if they are similar materials and the "other process" requires the product. See *In re Kamlet* 88 USPQ 106 CCPA 1950.

Response to Arguments

Applicant's arguments filed 1/22/03 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

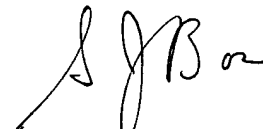
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony J Kuhar whose telephone number is 703-305-7095. The examiner can normally be reached on 8:45 am - 5:15 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stan Silverman can be reached on 703-308-3837. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

AK

AK
March 24, 2003


**STEVEN BOS
PRIMARY EXAMINER
GROUP 1100**